Editorial

Endocrinology @ the nobels

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For practitioners of endocrinology, ours is the most challenging, interesting, and inclusive of all medical specialties. Covering the entire body from head to toe, and sharing common ground with specialties as diverse as oncology and dermatology, the study of hormones straddles the vast expanse of medical science as no other superspecialty can. At the same time, various basic, paraclinical, investigative, and therapeutic branches contribute, in no small way, to the growth of endocrine medicine as well.

Endocrinology continues to grow daily, with new hormones and hormone-like factors being discovered regularly. But how important are these discoveries in the over all scheme of medical science? What importance does the rest of medicine place on endocrinology? One such way to find out is by analyzing the Nobel Prize list in Medicine or Physiology, as well as other subjects. By doing so, one can get a fair idea of the momentous and path-breaking discoveries and inventions in medicine. One can also assess the relative contribution of different disciplines to the growth of medicine.

Endocrinology has always had a strong showing at the Nobel Prizes. While efforts have been made earlier to collate lists of Nobel Prize laureates who have worked in endocrinology,[1,2] an exhaustive and detailed compilation of the same has not been highlighted. This is in contrast to detailed descriptions of prize-winning work on other fields of medicine, such as the immune system and nerve signaling, which are available on the official Nobel Prize website.[3,4] An effort, therefore, needs to be made in order to showcase the impact of endocrinology, whether basic, clinical, or applied, at this global forum.

Endocrine researchers have bagged not only the Medicine, but also the Chemistry Prize, for their work related to this field [Tables 1 and 2]. An in-depth analysis of the endocrine discoveries, for which the Nobel Prize was awarded, throws

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Table 1: Physiology/medicine Nobel Prize winning endocrine discoveries related to endocrinology

1903	Niels Ryberg Finsen	Light radiation
1909	ET Kocher	Thyroid
1923	F Banting, J Macleod	Insulin
1936	Sir Henry Dale, Otto Loewi	Chemical transmission of nerve impulses.
1947	CF Cori, GT Cori	Catalytic conversion of glycogen
1947	BA Houssay	Role of anterior pituitary hormone in sugar metabolism
1950	EC Kendall, T Reichstein, PS Hench	Adrenal cortex hormones
1953	H Krebs, F Lipmann	Krebs cycle, coenzyme A
1955	H Theorell	Oxidative enzymes
1964	K Bloch, F Lynen	Cholesterol and fatty acid metabolism
1966	CB Huggins	Hormonal treatment of prostate cancer
1970	Sir B Katz, U von Euler, J Axelrod	Acetylcholine, noradrenaline
1971	EW Sutherland jr	Mechanism of action of hormone (cAMP)
1977	R Guillemin, AV Schally	Peptide hormones of brain
1977	R Yalow	Radioimmunoassay
1982	SK Bergstrom, BI Samuelsson, JR Vane	Prostaglandins
1985	MS Brown, JL Goldstein	Cholesterol metabolism, LDL receptors
1986	S Cohen, R Levi-Montalcini	Growth factors
1992	EH Fischer, EG Krebs	Reversible protein phosphorylation
1994	AG gilman, M Rodbell	G proteins
1998	RF Furchgott, LJ Ignarro, F Murad	Role of nitric oxide
2000	A Carlsson, P Greengard, E Kandel	Dopamine and its importance
2010	RG Edwards	*In vitro* fertilization

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Table 2: Chemistry Nobel Prize winning discoveries related to endocrinology

1927	H Wieland	Bile acids, ergosterol, Vitamin D
1928	A Windaus	Sterols and connections with vitamins
1939	AFJ Butenandt	Work on sex hormones
1939	L Ruzicka	Work on terpens (cholesterol/ testosterone)
1943	G de Hevesy	Use of radioactive tracers
1955	V du Vigneaud	Synthesis of oxytocin
1958	F Sanger	Work on structure of proteins, esp. insulin
1964	DC Hodgkin	Use of Xray crystallography to determine structures, incl. Vit B 12.
1997	PD Boyer, JE Walker	Mechanism of synthesis of ATP
1997	JC Skou	Discovery of Na+ K+ ATP ase

up interesting observations. Endocrinology is one branch which has continued to excel in innovations throughout the last century. Virtually no decade has gone by in which our colleagues have not won a Nobel Prize. This is in contrast to other subjects which have had patchy showings, or have faded out with time, such as infectious disease.

The nature of discoveries, however, has changed perceptibly over the last 100 years. Initial Nobel laureates worked to discover hormones (insulin, vitamin D), while later counterparts toiled to unravel mechanisms of action and metabolic pathways. These secular trends trace a path of development from the study of classic endocrinology in the first half of the 20th century to the emergence of metabolism in the mid-20th century. The mid-20th century also witnessed the growth of drug development and structural chemistry, in parallel with advances in endocrinology. This is reflected in the work of Nobel laureates of that time. The past few years have been marked by a greater understanding of what can be called as "modern" or "nontraditional" hormones and signaling systems. G proteins, nitric oxide, and dopamine, all Nobel Prize - winning entities, have become integral parts of endocrinology.

Nobel Prizes have recently gone to innovations in what we may term "applied endocrinology," e.g., *in vitro* fertilization. This augurs well for the growth of clinical endocrinology as a discipline.

Women researchers have achieved a relatively stronger presence in endocrinology. Of the 10 women who have won the Nobel Prize in Medicine or Physiology, 3 have worked in this field. They include GT Cori, R Yalow, and R Levi- Montalcini, in 1947, 1977, and 1986, respectively [Table1]. Another woman researcher, DC Hodgkin won the 1964 Nobel Prize in Chemistry for her work on X-ray crystallography, which helped discover the structure of various hormones, including insulin.

The record for the youngest Nobel Laureate is held by an endocrinologist. F. Banting was 32 years old when he won the Prize in 1923.[1] The honor of being the oldest living Nobel laureate, and the only one who has crossed a century, goes to R Levi-Montalcini, who discovered nerve growth factor (NGF).[5] She attributes her longevity to the daily use of NGF.

Endocrinology has been served well by its flag bearers at the Nobels. As our specialty grows, not only in India, but across the globe, we hope this trend of excellence continues.

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